

DPP-1

1. The value of $\log_2 \left(\frac{1}{7^{\log_7 0.125}} \right)$, is
 (A) 1 (B) 2 (C) 3 (D) 4
2. The value of $\log_{\frac{1}{6}} 2 \cdot \log_5 36 \cdot \log_{17} 125 \cdot \log_{\frac{1}{\sqrt{2}}} 17$, is equal to
 (A) -3 (B) -6 (C) 6 (D) 12
3. Let x satisfies the equation $\log_3 (\log_9 x) = \log_9 (\log_3 x)$ then the product of the digits in x is
 (A) 9 (B) 18 (C) 36 (D) 8
4. If $\log_2 (\log_3 (\log_4 x)) = 0$, $\log_4 (\log_3 (\log_2 y)) = 0$ and $\log_3 (\log_4 (\log_2 z)) = 0$, then the correct option is
 (A) $x > y > z$
 (B) $x > z > y$
 (C) $z > x > y$
 (D) $z > y > z$
5. If $\log_3 (\log_2 a) + \log_{\frac{1}{3}} \left(\log_{\frac{1}{2}} b \right) = 1$, then the value of ab^3 is
 (A) 9 (B) 3 (C) 1 (D) $\frac{1}{3}$
6. If $\log (x + y) = \log 2 + \frac{1}{2} \log x + \frac{1}{2} \log y$, then
 (A) $x + y = 0$
 (B) $xy = 1$
 (C) $x^2 + xy + y^2 = 0$
 (D) $x - y = 0$
7. $\frac{1}{\log_{\sqrt{bc}} abc} + \frac{1}{\log_{\sqrt{ca}} abc} + \frac{1}{\log_{\sqrt{ab}} abc}$ has the value equal to
 (A) 1/2 (B) 1 (C) 2 (D) 4
8. If $5x^{\log_2 3} + 3^{\log_2 x} = 162$ then logarithm of x to the base 4 has the value equal to
 (A) 2 (B) 1 (C) -1 (D) 3/2
9. The value of $\log_{\frac{4}{3}} \left(\frac{56 + \sqrt{56 + \sqrt{56 + \sqrt{56 + \dots \infty}}}}{\sqrt{64 \sqrt{64 \sqrt{64 \dots \infty}}}} \right)$ is equal to
 (A) 0 (B) 2 (C) 3 (D) 4

10.

	Column-I		Column-II
(A)	$\log_2 x = -\log_{\frac{1}{2}} 7$, then the value of x is	(P)	$\frac{1}{49}$
(B)	$\log_8 y = \frac{-1}{\log_3 2}$, then the value of y is	(Q)	$\frac{1}{36}$
(C)	$\log_{\frac{1}{4}} z = \log_2 6$, then the value of z is	(R)	$\frac{1}{27}$
(D)	$\log_{\frac{1}{9}} w = \log_3 7$, then the value of w is	(S)	7
		(T)	$\frac{1}{6}$

DPP-2

- If $\log_7 2 = m$, then the value of $\log_{49} 28$ is
 (A) $2(1 + 2m)$ (B) $\frac{1+2m}{2}$ (C) $\frac{2}{1+2m}$ (D) $1 + m$
- Let x, y and z be positive real numbers such that $x^{\log_2 7} = 8, y^{\log_3 5} = 81$ and $z^{\log_5 216} = \sqrt[3]{5}$. The value of $x^{(\log_2 7)^2} + y^{(\log_3 5)^2} + z^{(\log_5 216)^2}$, is
 (A) 526 (B) 750 (C) 874 (D) 974
- Suppose n be an integer greater than 1, let $a_n = \frac{1}{\log_n 2002}$. Suppose $b = a_2 + a_3 + a_4 + a_5$ and $c = a_{10} + a_{11} + a_{12} + a_{13} + a_{14}$. Then $(b - c)$ equals
 (A) $\frac{1}{1001}$ (B) $\frac{1}{1002}$ (C) -1 (D) -2
- Product of all the solution of equation $x^{\log_{10} x} = (100 + 2\sqrt{\log_2 3} - 3\sqrt{\log_3 2})x$ is
 (A) $\frac{1}{10}$ (B) 1 (C) 10 (D) 100
- If $L = \sum_{r=7}^{2400} \log_7 \left(\frac{r+1}{r}\right)$, $M = \prod_{r=2}^{1023} \log_r (r+1)$ and $N = \sum_{r=2}^{2011} \left(\frac{1}{\log_r p}\right)$ where $p = (1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot \dots \dots \dots 2011)$, then
 (A) $L + M = 13$
 (B) $M^2 + N^2 = 101$
 (C) $L - M + N = 6$
 (D) $LMN = 30$
- If $\prod_{r=3}^{26} \log_r (r+1) = 3^x$, then find the value of x .
- If $P = \log_5 (\log_5 3)$ and $3^{C+5^{-P}} = 405$ then C is equal to
 (A) 3 (B) 4 (C) 81 (D) 5
- If $x = 500, y = 100$ and $z = 5050$, then the value of $(\log_{xyz} x^z)(1 + \log_x yz)$ is equal to
 (A) 500 (B) 100 (C) 5050 (D) 10
- If $\frac{a+\log_4 3}{a+\log_2 3} = \frac{a+\log_8 3}{a+\log_4 3} = b$, then b is equal to
 (A) $\frac{1}{2}$ (B) $\frac{2}{3}$ (C) $\frac{1}{3}$ (D) $\frac{3}{2}$
- Which of the following vanishes?
 (A) $\log \tan 1^\circ \cdot \log \tan 2^\circ \cdot \log \tan 3^\circ \dots \dots \log \tan 89^\circ$
 (B) $\log \sin 1^\circ \cdot \log \sin 2^\circ \cdot \log \sin 3^\circ \dots \dots \log \sin 90^\circ$
 (C) $7^{\log_3 5} + 3^{\log_5 7} - 5^{\log_3 7} - 7^{\log_5 3}$
 (D) $\log \tan 1^\circ + \log \tan 2^\circ + \log \tan 3^\circ + \dots \dots + \log \tan 89^\circ$.

11.

	Column-I		Column-II
(A)	Given $x > 1$ and $\log_x (x^{(x^2)}) + \log_x (x^{(-5x)}) = \log_x (1/x^6)$. The sum of all values of x that satisfying the equation, is	(P)	2
(B)	Let $0 < x < \pi$, $3^{(\tan x)} = 27^{(\sin x)}$, then the value of $\sec x$, is	(Q)	3
(C)	Let $a = x - 2$ and $b = x - 4$. The value of x satisfying the equation $(\log_a (x - 3) \log_b (x + 10)) / (\log_b (x - 3)) = 2$, is	(R)	4
(D)	The real values of x so that all terms are real and	(S)	5
		(T)	6 satisfy the equation $\sqrt{2x} = \sqrt{x+7} - 1$, is

DPP-3

1. The value of the expression $\frac{1}{\log_4 (18)} + \frac{1}{2\log_6 (3) + \log_6 (2)} + \frac{5}{\log_3 (18)}$, is
 (A) odd (B) an irrational
 (C) even composite (D) twin prime with 5
2. Given that $\frac{1}{\log_7 2} + \frac{1}{\log_9 4} = x$, then which of the following will divide $(4)^x$?
 (A) 3 (B) 7 (C) 9 (D) 21
3. If $\log_5 (3^x - 4^y) = 3$ and $3^{\frac{x}{2}} - 2^y = 5$, then $\frac{x}{y}$ is equal to
 (A) $\frac{2(\log_2 5) - 2}{1 + \log_2 5}$ (B) $\frac{(\log_3 5) + 2}{1 + \log_2 5}$ (C) $\frac{2(\log_3 5) + 2}{1 + \log_2 5}$ (D) $\frac{2(\log_3 5) + 1}{1 + \log_2 5}$
4. If $x \geq y > 1$ then the maximum value of $\log_x \left(\frac{x}{y}\right) + \log_y \left(\frac{y}{x}\right)$ is equal to
 (A) -2 (B) 0 (C) 2 (D) 4
5. If $\log_2 (\log_8 x) = \log_8 (\log_2 x)$, find the value of $(\log_2 x)^2$.
6. If $10^{\log_a (\log_b (\log_c x))} = 1$ and $10^{(\log_b (\log_c (\log_a x)))} = 1$ then, a is equal to
 (A) $\frac{a}{b}$ (B) c^{ab} (C) ab (D) $c^{b/c}$
7. If $x \in \mathbb{R}$, then number of real solution of the equation $2^x + 2^{-x} = \log_5 24$ is
 (A) 0 (B) 1 (C) 2 (D) more than 2
8. Number of real solution(s) of the equation $9^{\log_3 (\ln x)} = \ln x - (\ln^2 x) + 1$ is equal to
 (A) 0 (B) 1 (C) 2 (D) 3
9. Which of the following real numbers is(are) non-positive?
 (A) $\log_{0.3} \left(\frac{\sqrt{5}+2}{\sqrt{5}-2}\right)$ (B) $\log_7 (\sqrt{83} - 9)$
 (C) $\log_{2-\sqrt{3}} (\sqrt{2} + 1)$ (D) $\log_2 \sqrt{9 \cdot \sqrt[3]{27^{\frac{-5}{3}} \cdot 243^{\frac{-7}{5}}}}$
10. Let $x = 4^{\log_2 \sqrt{9^{k-1}+7}}$ and $y = \frac{1}{32^{\log_2 \sqrt[5]{3^{k-1}+1}}}$ and $xy = 4$, then the sum of the cubes of the real value(s) of k is
 (A) 1 (B) 5 (C) 8 (D) 9

11.

	Column-I		Column-II
(A)	The value of expression $3\sqrt{\log_{27} 8} - 2\sqrt{\log_{32} 243} - 5\sqrt{\log_{625} 81} + 3\sqrt{\log_9 25} + \sqrt{2^{\log_2 9}} +$ $3^{\log_4 25} - 5^{\log_4 9}$, is less than	(P)	2
(B)	The value of x satisfying the equation $2^{\log_5 e^{\ln 5^{\log_5 7^{\log_7 10^{\log_{10} (8x-3)}}}}} = 13$, is	(Q)	3
(C)	The number $N = \left(\frac{1}{\log_2 \pi} + \frac{1}{\log_6 \pi}\right)$ is less than	(R)	4
(D)	Let $l = (\log_3 4 + \log_2 9)^2 - (\log_3 4 - \log_2 9)^2$ and $m =$ $(0.8)(1 + 9^{\log_3 8})^{\log_{65} 5}$ then $(l + m)$ is divisible by	(S)	5
		(T)	6

DPP-4

1. Find the sum of all integral values of x satisfying $(\log_5 x)^2 + \log_{5x} \left(\frac{5}{x}\right) = 1$.
2. Given that $\log 2 = 0.301$, find the number of digits before decimal in the solution to the equation $\log_5 (\log_4 (\log_3 (\log_2 x))) = 0$
3. Let $N = \log_3 \left(\frac{\log_3 3^{3^{3^3}}}{\log_{3^3} 3^{3^3}} \right)$, then find the sum of digits in N .
4. The equation $(\log_{10} x + 2)^3 + (\log_{10} x - 1)^3 = (2\log_{10} x + 1)^3$ has
 (A) no natural solution
 (B) two rational solutions
 (C) no prime solution.
 (D) one irrational solution.
5. If $\log_{30} (3) = \alpha$ and $\log_{30} (5) = \beta$, then $\log_{30} (8)$ is equal to
 (A) $3(1 + \alpha - \beta)$
 (B) $3(1 + \alpha + \beta)$
 (C) $3(\alpha + \beta)$
 (D) $3(1 - \alpha - \beta)$

6.

	Column-I		Column-II
(A)	If $\left(\log_2 \left(\log_{\frac{1}{2}} (\log_2 a) \right) \right)^2 + \left(\log_3 \left(\log_{\frac{1}{3}} (\log_3 b) \right) \right)^2 = 0$ then $(a^2 + b^3)$ is greater than	(P)	1
(B)	If $11^{\log_{10} x} = 242 - x^{\log_{10} 11}$ then x is coprime with	(Q)	2
(C)	If $p = \sqrt[3]{\sqrt{2} + 1} - \sqrt[3]{\sqrt{2} - 1}$ then the value of $(p^3 + 3p + 1)$ is less than	(R)	3
(D)	If $\log_{\frac{\sqrt{x}}{2}} (\log_9 (\sqrt{3} + \sqrt{12})) = 2$, then the value of x is twin prime with	(S)	4
		(T)	5

7.

	Column-I		Column-II
(A)	If $\log_b 3 = 4$ and $\log_{b^2} 27 = \frac{3a}{2}$ then the value of $(a^2 - b^4)$ is equal to	(P)	2
(B)	If number of digits in 12^{11} is 'd', and number of cyphers after decimal before a significant figure starts in $(0.2)^9$ is 'c', then $(d - c)$ is equal to	(Q)	3
(C)	The number $N = \left(\frac{1}{\log_2 \pi} + \frac{1}{\log_6 \pi} \right)$ is less than	(R)	6
(D)	If $N = \text{antilog}_3 \left(\log_6 \left(\text{antilog}_{\sqrt{5}} (\log_5 1296) \right) \right)$ then the characteristic of $\log N$ to the base 2, is equal to	(S)	13

DPP-5

Paragraph for question nos. 1 to 3

$\log_M N = \alpha + \beta$, where α is an integer & $\beta \in [0,1)$

1. If M & α are prime & $\alpha + M = 7$ then the greatest integral value of N is
 (A) 64 (B) 63 (C) 125 (D*) 124
2. If M & α are twin prime & $\alpha + M = 8$ then the greatest integral value of N is
 (A) 624 (B) 625 (C*) 728 (D) 729
3. If M & α are relative prime & $\alpha + M = 7$ then minimum integral value of N is
 (A) 25 (B) 32 (C*) 6 (D) 81
4. Number of ordered pair(s) of (x, y) satisfying the system of equations, $\log_2 xy = 5$ and $\log_{1/2} \frac{x}{y} = 1$ is :
 (A) one
 (B) two
 (C) three
 (D) four
5. Find the sum of all possible values of x satisfying the equation

$$\sqrt{x^2 - 4x + 4} = (\log_2 9)(\log_3 \sqrt{5})(\log_{25} 256)$$
6. If sum of the integral values of x satisfying the equation $|x - 1|^{\log^2 x - \log x^2} = |x - 1|^3$ is N , then find characteristic of logarithm of N to the base 5.
7. If A is the number of integers whose logarithms to the base 10 have characteristic 11 and B the number of integers, the logarithm of whose reciprocals to the base 10 have characteristic -4, then the value of $(\log_{10} A - \log_{10} B)$ is equal to
 (A) -7
 (B) 7
 (C) 8
 (D) 9
8. The expression $\frac{\left(\log_{\frac{a}{b}} p\right)^2 + \left(\log_{\frac{b}{c}} p\right)^2 + \left(\log_{\frac{c}{a}} p\right)^2}{\left(\log_{\frac{a}{b}} p + \log_{\frac{b}{c}} p + \log_{\frac{c}{a}} p\right)^2}$ wherever defined, simplifies to
 (A) 1
 (B) 2
 (C) 3
 (D) 4

9. If x satisfies the equation $\log_{125} x^3 - 3\sqrt{\log_{25} x^2} = 4$, then find the number of digits in x .

10.

Column-I		Column-II	
(A)	The expression $x =$ $\log_2 \log_9 \sqrt{6 + \sqrt{6 + \sqrt{6 + \dots \infty}}}$ simplifies to	(P)	An integer
(B)	The number $N =$ $2^{(\log_2 3 \cdot \log_3 4 \cdot \log_4 5 \dots \log_{99} 100)}$ simplifies to	(Q)	A prime
(C)	The expression $\frac{1}{\log_5 3} + \frac{1}{\log_6 3} - \frac{1}{\log_{10} 3}$ simplifies to	(R)	A natural
(D)	The number $N =$ $\sqrt{2 + \sqrt{5}} - \sqrt{6 - 3\sqrt{5}} + \sqrt{14 - 6\sqrt{5}}$ simplifies to	(S)	a composite

ANSWER KEY

DPP-1

1. (C) 2. (D) 3. (D) 4. (B) 5. (C) 6. (D) 7. (B)
8. (D) 9. (A) 10. (A) S ; (B) R ; (C) Q ; (D)

ANSWER KEY

DPP-2

1. (B) 2. (D) 3. (C) 4. (C) 5. (ABD) 6. (1) 7. (B)
8. (C) 9. (C) 10. (ABCD)
11. (A) $\rightarrow$ S; (B) $\rightarrow$ Q; (C) $\rightarrow$ T; (D) $\rightarrow$ P

ANSWER KEY

DPP-3

1. (AD) 2. (ABCD) 3. (C) 4. (B) 5. (27) 6. (D) 7. (A)
8. (B) 9. (ABCD) 10. (D)
11. (A) $\rightarrow$ R, S, T; (B) $\rightarrow$ P; (C) $\rightarrow$ Q, R, S, T; (D) $\rightarrow$ P

ANSWER KEY

DPP-4

1. (6) 2. (0025) 3. (0007) 4. (BCD) 5. (D)
6. (A) $\rightarrow$ P, Q, R, S ; (B) $\rightarrow$ P, R; (C) $\rightarrow$ S, T; (D) $\rightarrow$ T
7. (A) $\rightarrow$ S, (B) $\rightarrow$ R, (C) $\rightarrow$ Q

ANSWER KEY

DPP-5

1. (D) 2. (C) 3. (C) 4. (B) 5. (0004) 6. (4)
7. (C) 8. (A) 9. (0012)
10. (A) $\rightarrow$ P, (B) $\rightarrow$ P, R, S, (C) $\rightarrow$ P, R, (D) $\rightarrow$ P, Q, R